Science's First Move Towards Putting a Volcano to Work

How Windows Are Being Put Into the Side of Kilauea, "the Most Spectacular and Continuously Active Crater on Earth," as the First Step Toward Tapping Its Tremendous Heat and Energy.

THE dragon that lies under the rocks and bleak, twisted lava of Kilauea and—as every serious-minded Hawaiian knows — spouts forth flame and ashes and steam when affairs on the island are not to his liking, is about to be routed out.

Science knows strange disregard for omnipotent creatures who shake the earth with their wrath and hurl red-hot stones upon vineyards and cocoanut groves. Accordingly a steam-shovel, hydraulic probe, compressed air machines, and all the other trappings that have penetrated the fastnesses of other mountains and conquered the depths of the earth beneath cities and mighty rivers soon are to be set up at the side of one of the most constantly active volcanoes in all the world. And if it proves that a fiery dragon indeed lies curled at the bottom of the grotesque pile, the group working under direction of the Hawaiian Volcano Observatory are more than likely to drag him out by the tail for the islanders who have suffered from his evil disposition to demolish as they see fit!

It may as well be understood at once, however, that the scientists are not looking for dragons. What they expect to discover is a method for putting to practical use the steam, gas and energy they now believe to be stored inside of the grim old smoking mountain.

The project of setting Kilauea to work is the most terrific of the age. It is more gigantic in one way than even the conquest of the air, since science in that engagement worked with an element that at least was not virulently antagonistic. Mastery of the mountain means a long fight against clouds of scalding steam likely to be released without warning; it means braving the horror of the deadliest of known gases; chemicals so at variance with the human body as to cause instant death if the smallest particle penetrates the lungs.

It also means constant danger of being crushed beneath rocks hurled with the force of gun-fire, and burned to death under showers of red-hot ashes and lava.

The heads of the Hawaiian Volcano Observatory, who plan to supervise the work on the ground are nothing daunted by peril. They will begin by boring through the great sulphur walls which form the sides of the mountain, and again through the deposits in the actual floors of the craters. By this means they will find it possible to measure the heat at various levels and to determine the quantity of steam at intervals. Also the mineral nature of the formation will be revealed.

It was only a few years ago that many physicists held to the theory that the earth is a molten ball covered by a thin crust of ground. It was believed that volcanoes were merely vents to this great inner fire, and being connected with the interior mass of molten rock were, in a sense, connected with each other.

It has been decided now, however, that the earth is a solid body and volcanoes vents of great interior lakes of molten matter. There is, therefore, no common centre for all the volcanoes of the earth.

Another theory long held is that a volcano was virtually a steam engine. The presence of bodies of steam under influence of great heat and pressure was supposed to account for the blowing off of the head of the mountain from time to time.

But observations from the station in Hawaii show that force could not of itself be sufficient to cause such tremendous upheaval, since the quantity of steam is limited. It is to tap the heat and energy stored in this steam that pipes will be run through the earth to conduct an endless supply to points where it might be used to heat houses and run engines. Other conduits will be run from Kilauea, if plans work out, for the purpose of carrying heat. This is a more obscure project than transporting steam, since less is understood of the store of warmth. Observations made in many parts of the world indicate that the temperature rises with amazing rapidity on the downward way. The rate of increase is so rapid on a one-mile level that, if it increases accordingly at a five or ten-mile depth, the earth's surface will be decided a mere shell over great interior sources of heat. It now is stated with some certainty that there is a complicated labyrinth of passages below the ground in which the heat varies.

With the top of Kilauea covered with power houses, engines, workmen's shacks, tool sheds and all the other signs of industry, romance and adventure will be driven a little farther into the place where outworn things go. For since Mark Twain brought the strange corners of the Hawaiian Islands before an interested public in his "Roughing It," the volcano has been a goal of tourists, specially feminine ones.

Mildred Leo Clemens, cousin of the humorist, was one of the most recent explorers of Kilauea. A graduate of the University of California and well known as a lecturer and writer, she made a pilgrimage to the smoking mountain with a company of native guides, after visiting the extinct volcano Haleakala on the Island of Maui. She climbed to the top of this mountain, 10,032 feet, and descended into the bowl. Walking the seven and a half miles across, she emerged through a gap which really was a fissure in cooled lava.

Jack London, Alice Roosevelt and a few other nature lovers have made this same perilous trip.

And—by the way—it must be admitted that dead old Vesuvius, which has smoked complacently above the Bay of Naples since Rome was in its glory, is a close rival for popularity with the Hawaiian mountain. Despite the new activity of Vesuvius, which began last February, women almost daily are climbing its hostile sides and peering into the glowing crater. Since February a new cone has formed which ejects a stream of lava 30 feet wide and pours out masses of reddish smoke and red-hot stones. The floor of the crater, which is yellow with sulphur, is over a quarter of a mile across and more than 200 feet deep.

Kilauea, however, has 51 craters, 22 of which constantly emit columns of gray smoke. Vertical walls of brilliant flame rise from their pits. And though the height of the mountain is no greater than that of Vesuvius, the crater is 2000 feet across and its circumference five and a half miles. And despite the terrible play of light, and swirling clouds of smoke, gases and steam, the crater always is traversible about the edges of the fiery lakes and streams of molten lava. This accounts for the popularity of the mountain as a gathering place for travelers.

An interesting comparison between Vesuvius and Kilauea has been made by a scientist.

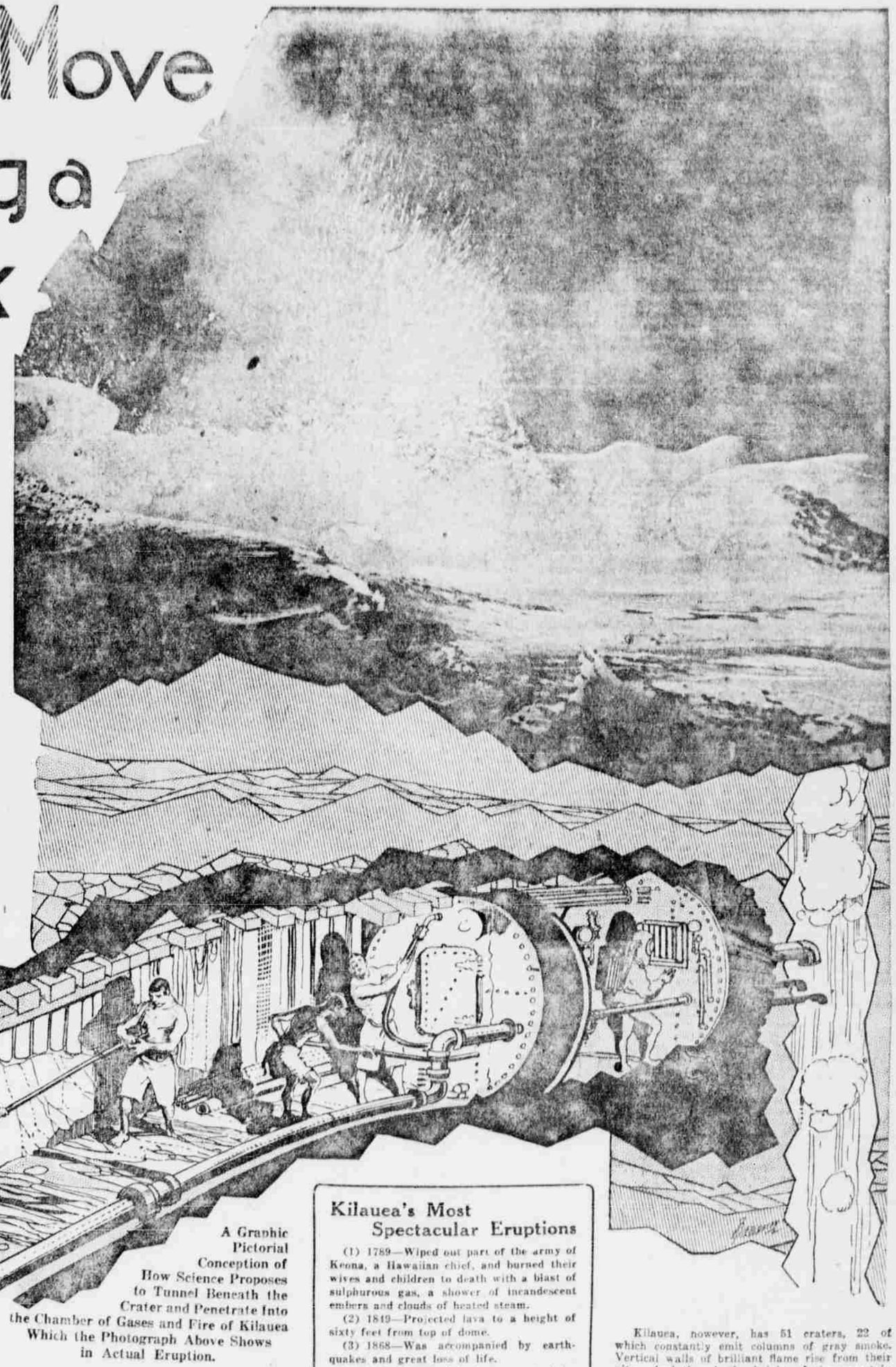
"The crater of Vesuvius may be accessible after an eruption, but as a usual thing there is such a heavy discharge of vapor and cinders long before the time that descending the bowl is impossible. Kilauea always is accessible.

"Even before an eruption one may stand on the brink of the great pit and watch the boiling caldrons and sweeping lava floods and blowing cones. So set are the courses of the lava streams that the crater may be traveled with safety and camping places may be made at the edges of the fiery lakes, if the heat is not too great."

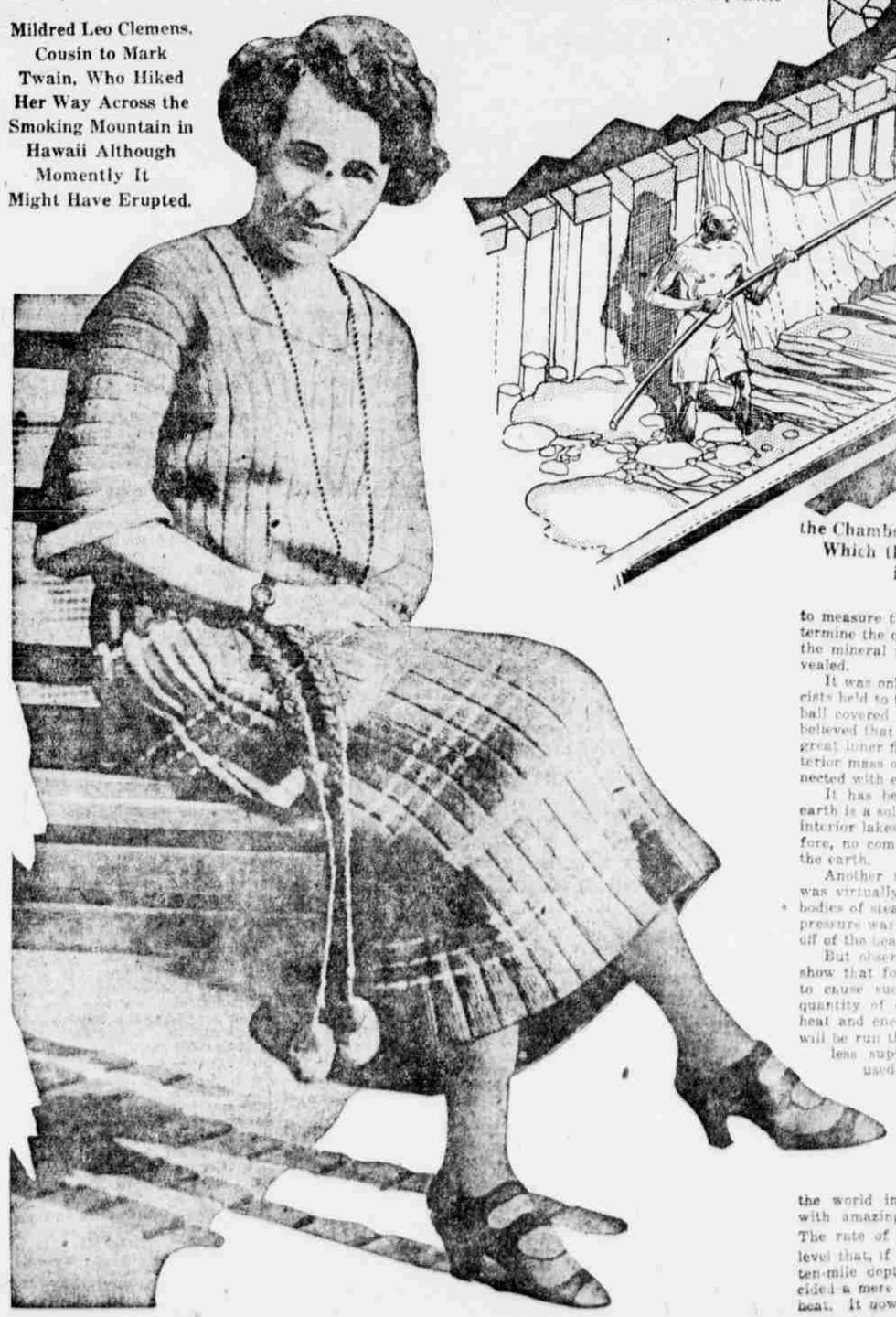
Kilauea, besides being the most spectacular and continuously active volcano on earth, is likewise a marvelous storage-dump of chemicals. The vapors emitted by the liquid lavas are composed largely of steam, according to reports of investigators, with very little smoke. Sulphurous acid is the most common of the vapors next to water. It has the odor of burning sulphur. Hydrogen escapes with the liquid lava, released by the action of extreme heat on water. Chlorine is emitted when sea water finds access to the lava column, leaving chlorides as incrustations on the lavas, among which are common salt and iron chloride.

Hydrogen sulphide likewise is found, as well as carbonic acid, hydrochloric acid and nitrogen. Pyrite, marcasite and iron sulphides in the rocks below the crater are believed to be the source of sulphur and its gases.

In caverns about Kilauea sulphates are produced by escaping gases. Gypsum, hydrous aluminum sulphate and aluminum sodium sulphate, glauber salt and blue vitriol are deposits of the gases, which change the rocks to earth.



A Graphic Pictorial Conception of How Science Proposes to Tunnel Beneath the Crater and Penetrate Into the Chamber of Gases and Fire of Kilauea Which the Photograph Above Shows in Actual Eruption.



Mildred Leo Clemens, Cousin to Mark Twain, Who Hiked Her Way Across the Smoking Mountain in Hawaii Although Momently It Might Have Erupted.

Kilauea's Most Spectacular Eruptions

(1) 1789—Wiped out part of the army of Keona, a Hawaiian chief, and burned their wives and children to death with a blast of sulphurous gas, a shower of incandescent embers and clouds of heated steam.

(2) 1819—Projected lava to a height of sixty feet from top of dome.

(3) 1868—Was accompanied by earthquakes and great loss of life.

(4) 1879—Knocked the bottom out of the crater.

(5) 1886—Repeated itself so often that there were forty-one eruptions and earthquakes during the year.

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